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ABSTRACT

The research and development (R&D) projects funded by the Florida Division of Vocational Education are intended to have utility for vocational educators in their efforts to improve vocational education programs and practices. This project was conducted to determine why some R&D products are accepted by potential users while others are not and to find alternative methods, procedures, and opportunities for providing feedback to media designers and diffusion personnel regarding the effectiveness of their decisions. The following procedures were used to achieve a holistic approach: (1) reviews of the literature on instructional design and diffusion of innovations; (2) interviews with professionals knowledgeable about the packaging and dissemination of instructional materials; (3) qualitative descriptions (scenarios) of "ideal" procedures; and (4) analysis of the flow of activities depicted in the scenarios to determine alternative opportunities for obtaining feedback. As a result of the project, a model was constructed that can be used by instructional designers and specialists. The model describes events that can have an impact on instructional materials usage and focuses attention on variables that can influence acceptance and use. Opportunities for obtaining feedback on design and design decisions are identified and the advantages and disadvantages of each opportunity are discussed. Appendixes include descriptions of five scenarios and the Purposes by Environments Matrix and a listing of references. (Author/KC)

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A Project to Design

A SYSTEM FOR EVALUATING R&D PRODUCTS AND PROVIDING FEEDBACK TO PRODUCTION AND DISSEMINATION PERSONNEL

Project # 4-2022

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Abstract of the Final Report

Title of the Project:	A System for Evaluating R&D Products and Providing Feedback to Production and Dissemination Personnel
Organization:	Florida State University, Learning Systems Institute, Center for Needs Assessment and Planning
Project Director:	Dr. Robert G. Stakenas
Expenditures:	$20,000.00
Duration of Project:	September 7, 1983- August 25, 1984
Project Number:	K11643

PROBLEM

The research and development (R&D) projects funded by the Division of Vocational Education are intended to have utility for vocational educators in their efforts to improve vocational education programs and practices. But products with viable utility often fail to be accepted by potential users. Division personnel responsible for full utilization of products frequently do not have answers to generic questions about variables that contribute to product acceptance and utilization.

OBJECTIVES

Design a system to answer the following questions:

- Why are some R&D products accepted by potential users while others are not?
- What alternative methods, procedures, and opportunities are useful for providing feedback to: (a) media designers regarding the effectiveness of their design and production decisions, and (b) dissemination and diffusion (D&D) personnel regarding the effectiveness of their strategic and procedural decisions?

PROCEDURES

The following procedures were used to achieve a holistic approach:

- Reviews of the literature on instructional design and diffusion of innovations.
- Interviews with professionals knowledgeable about the packaging and dissemination of instructional materials.
- Qualitative descriptions (scenarios) of "ideal" procedures.
- Analysis of the flow of activities depicted in the scenarios to determine alternative opportunities for obtaining feedback.

RESULTS AND POTENTIAL UTILIZATION

The report describes a conceptual model that can be used by instructional designers and (D&D) specialists. The model describes events which can have an impact on instructional materials usage and focuses attention on variables that can influence acceptance and use. Opportunities for obtaining feedback on design and D&D decisions are identified and the advantages and disadvantages of each opportunity are discussed.

A SYSTEM FOR EVALUATING R&D PRODUCTS AND PROVIDING FEEDBACK TO PRODUCTION AND DISSEMINATION PERSONNEL

Introduction

The Problem

The Division of Vocational, Adult and Community Education (DVACE) funds the development of many products including curriculum materials for acquiring occupational skills. These products are designed to have utility for vocational educators and students. But some products which initially appear to have utility fail to be accepted by potential users. Why are some products accepted more readily than others? Assuming relevance of the content, is it because of the product's style and format? Is it because of the dissemination and diffusion strategy used? Professional personnel responsible for the full utilization of instructional products frequently do not have answers to generic questions such as these.

The purpose of this project was to design a system which would provide answers to the following:

- Why are some R&D products accepted by potential users while others are not?
- What alternative methods, procedures and opportunities are useful for providing feedback to media designers regarding the effectiveness of their design and production decisions?
- What alternative methods, procedures and opportunities will be useful for providing feedback to dissemination and diffusion personnel regarding the effectiveness of their strategic and operational decisions?

How This Report Is Organized

This report consists of two parts and is organized according to the

conceptual models presented in Figures 1 and 2. We believe these models represent the various steps which should or might occur if vocational instructional needs are to be met successfully.

Part 1 presents Events one through nine (see Figure 2), and each of these events is described as follows:

1. A brief description of the given event appears at the top of the page.
2. Additional remarks provide discussion and an expanded definition of the event.
3. Participants, who are individuals likely to be involved in completing the event, are identified.
4. Next, implications associated with the completion of each event are presented. This section considers various actions which may promote successful accomplishment of the event which should, in turn, promote subsequent instructional materials' usage.
5. Following discussion of implications, individuals and data sources that could provide information which might promote successful accomplishment of the event are identified.

Part 2 of this report includes an introduction and describes opportunities for acquiring feedback for graphic designers, dissemination and diffusion (D&D) specialists, and other DVACE decision-makers and staff. For each opportunity, a discussion, possible questions, respondents, and data collection techniques are presented.

Three appendices are attached, also. Appendix A includes five scenarios describing events such as producing competency-based materials, packaging and disseminating instructional products, obtaining feedback on packaging and dissemination, and evaluating feedback. These

scenarios provide a narrative description of the technical processes described in Part 1 and Part 2 of this report.

The Appendix B contains the "Purposes by Environments Matrix." This matrix is intended to be a practical guide for determining what the physical attributes of given instructional materials should be. Appropriate physical attributes can be derived from the matrix since it was designed to lead a graphics designer through the steps involved in matching characteristics of the instructional purpose with the characteristics of the physical environment in which the materials will be used. Finally, Appendix C presents a list of references on the instructional materials development process. These articles provide information on the various phases of instructional materials design and development.

PART 1

Approach to the Problem

Whether instructional materials are judged to be useful depends on several variables. These variables include the: instructional objectives, language the objectives are written in, the format in which the content is presented, colors and highlighting techniques used to facilitate accessing information, ease of materials storage and retrieval, and the dissemination and diffusion strategies and tactics used.

Being able to address each variable and possible relations among them required using a holistic approach--one which would do justice to the many steps that are involved in the process beginning with identification of the need for instructional materials to the

dissemination and diffusion of these materials (see Figures 1 and 2). A variety of procedures were used to achieve a holistic approach. They included:

- o Reviewing the literature on instructional design and diffusion of innovations.
- o Interviewing professionals in vocational education who are knowledgeable about the packaging and dissemination of instructional materials.
- o Qualitatively describing "ideal" procedures by writing scenarios.
- o Analyzing the flow of activities depicted in the scearios to determine alternative opportunities for obtaining feedback for graphics designers and dissemination and diffusion specialists.

Assessing, addressing, and successfully meeting the need for job-related instructional materials is a complex and multifaceted process. This process begins with a needs assessment which identifies occupations requiring trained personnel and progresses through stages of analyzing an identified occupation, procuring or developing task-related instructional materials, and completing the graphic design of those materials before packaging and dissemination. (The major steps in this process are presented in a generic flowchart in Figure 1.) Each step contributes to meeting the needs for instructional materials in vocational education.

By incorporating an expanded conceptual model (see Figure 2), based on the generic flowchart, we considered factors which might promote the successful accomplishment of the events. We then considered associated implications related to selecting, designing, developing, producing and disseminating vocational instructional materials.

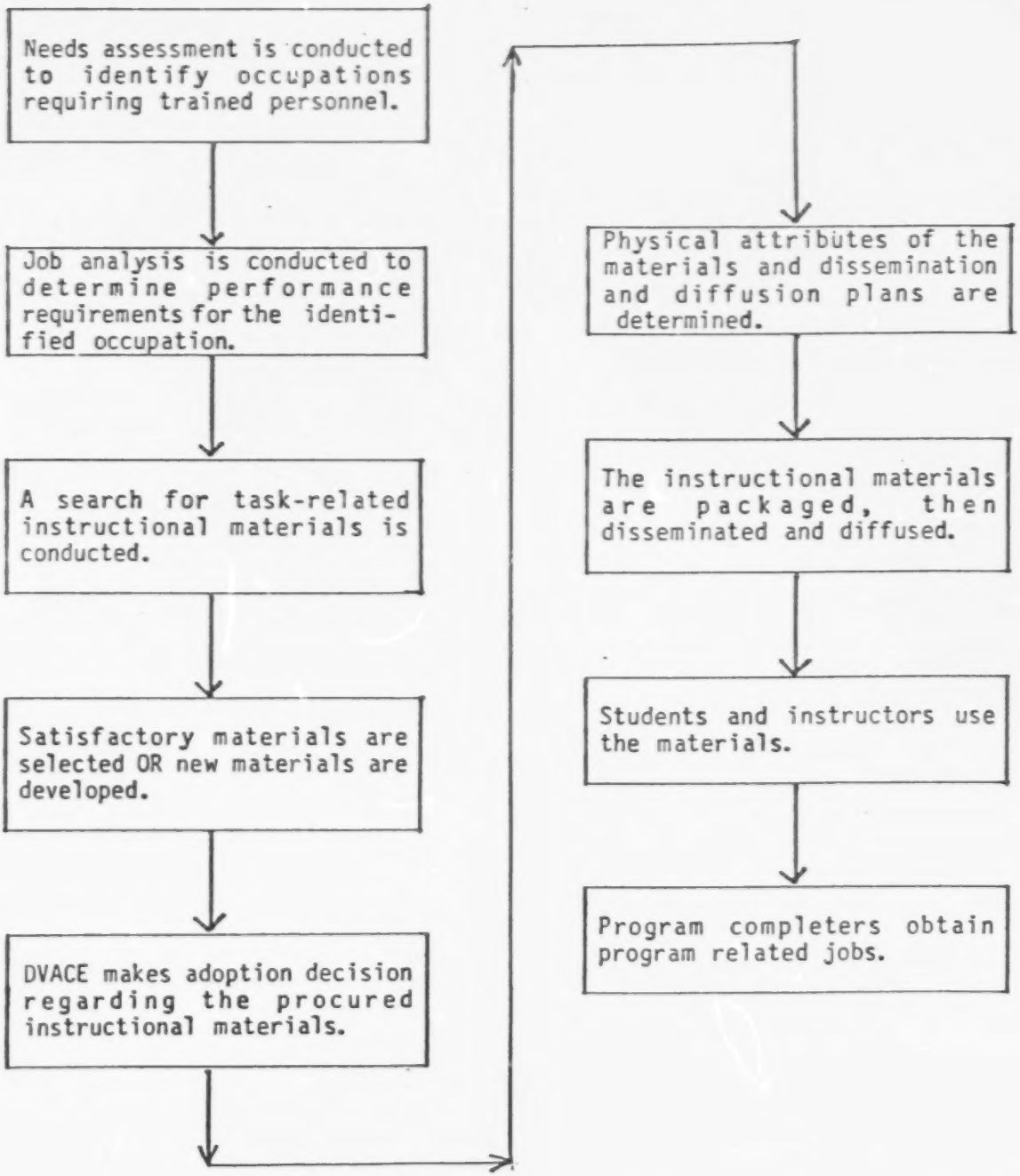
Needs assessment is conducted to identify occupations requiring trained personnel.
Job analysis is conducted to determine performance requirements for the identified occupation.
A search for task-related instructional materials is conducted.
Satisfactory materials are selected OR new materials are developed.
DVACE makes adoption decision regarding the procured instructional materials.
Physical attributes of the materials and dissemination and diffusion plans are determined.
The instructional materials are packaged, then disseminated and diffused.
Students and instructors use the materials.
Program completers obtain program related jobs.

Figure 1. Steps required to assess, address, and meet vocational instructional materials needs.

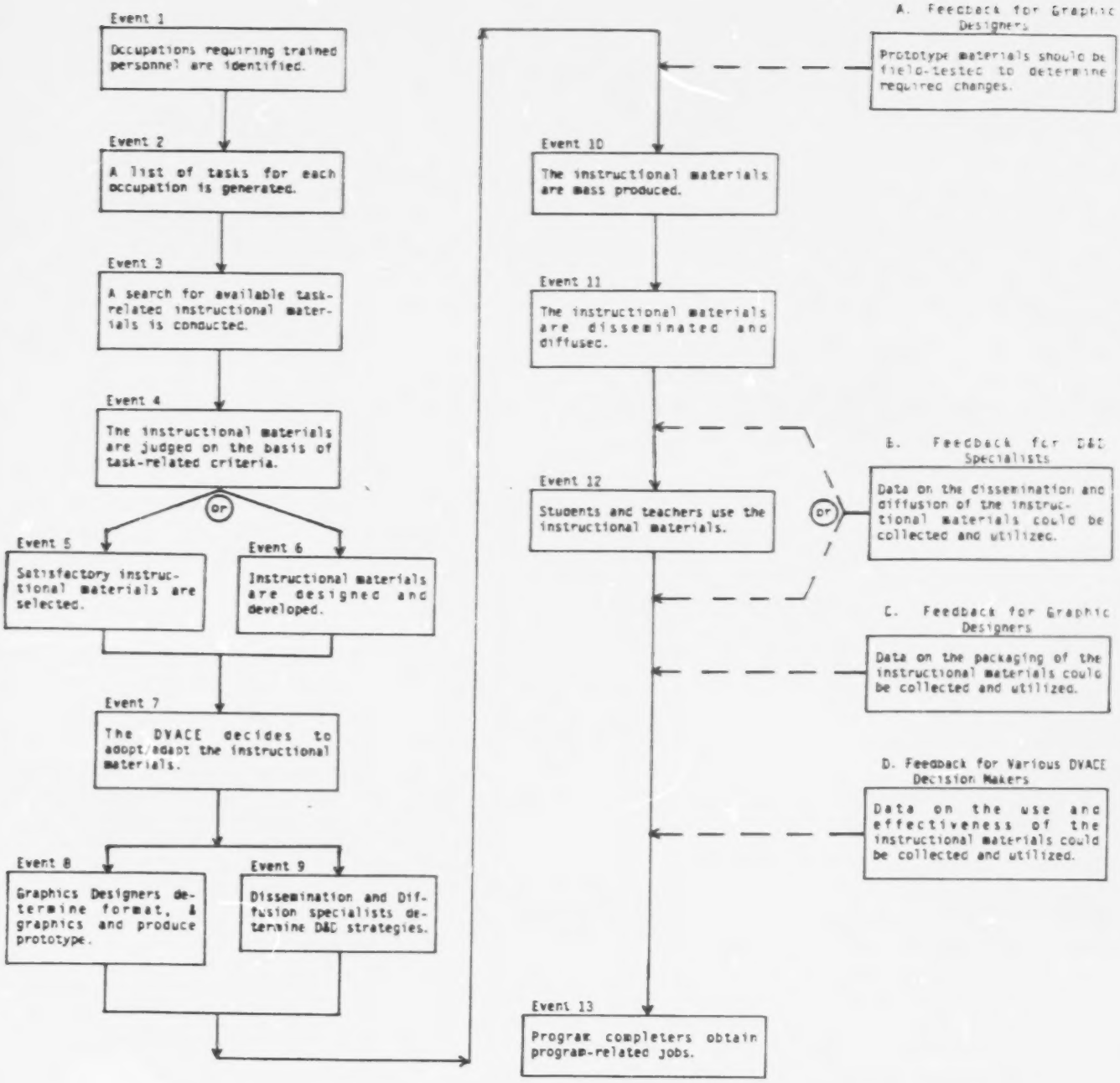
Event 1
Occupations requiring trained personnel are identified.
Event 2
A list of tasks for each occupation is generated.
Event 3
A search for available task-related instructional materials is conducted.
Event 4
The instructional materials are judged on the basis of task-related criteria.
or
Event 5
Satisfactory instructional materials are selected.
Event 6
Instructional materials are designed and developed.
Event 7
The DVACE decides to adopt/adapt the instructional materials.
Event 8
Graphics Designers determine format, & graphics and produce prototype.
Event 9
Dissemination and Diffusion specialists determine D&D strategies.
Event 10
The instructional materials are mass produced.
Event 11
The instructional materials are disseminated and diffused.
Event 12
Students and teachers use the instructional materials.
Event 13
Program completers obtain program-related jobs.
A. Feedback for Graphic Designers
Prototype materials should be field-tested to determine required changes.
B. Feedback for D&D Specialists
Data on the dissemination and diffusion of the instructional materials could be collected and utilized.
C. Feedback for Graphic Designers
Data on the packaging of the instructional materials could be collected and utilized.
D. Feedback for Various DVACE Decision Makers
Data on the use and effectiveness of the instructional materials could be collected and utilized.

Figure 2. Expanded conceptual model showing opportunities to obtain feedback for graphics designers and D&D specialists.

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Event 1

Occupations requiring trained personnel are identified.

In Event 1, a needs assessment is conducted to identify which occupations require trained personnel. After these occupations have been identified, curriculum requirements are determined. Instructional material requirements are, in turn, derived from curriculum requirements.

PARTICIPANTS: Event 1 is likely to involve vocational program directors, regional program consultants, and other DVACE personnel.

IMPLICATIONS

A. The extent of demand for training in the identified occupational area directly affects instructional materials usage.

Availability of jobs in a given occupation will produce demand for related training and ensure that instructors and students view associated instructional materials as necessary. Materials must be perceived as relevant if they are to be utilized. Materials perceived as nonrelevant certainly won't be used, regardless of the effectiveness of packaging and dissemination. Conducting a thorough needs assessment to identify occupations requiring trained personnel tends to ensure that related curriculum and instructional materials will be in demand.

Various types of data may be useful in determining the extent of demand for training in a given occupational area. Any of the following might be useful in making this determination: opinions of instructors, potential students, and vocational education administrators; extent of requests for training in the given area; enrollment in related training programs at

private institutions; current personnel requirements of potential employers; current Department of Labor data on supply and demand in the given occupation.

B. Future demand for training in the identified occupational area can affect instructional materials usage.

If demand for training in a given occupation decreases, the usage of related instructional materials is also likely to decrease. Thus, in Event 1, the future demand for trained personnel in the occupation might also be assessed.

The following types of information could be utilized to assess future demand for training in a given occupation: employment forecasts; projected personnel requirements of potential employers; expert opinion.

C. Although instructional materials for a given occupation may exist and be available to vocational instructors, there may still be a need for materials which can promote learner competency for that occupation.

There are two primary reasons why existing materials may be inadequate. First, the occupation in question may be undergoing rapid change, thus causing the content of existing materials to become outdated. Second, if the occupation has only recently emerged, existing materials may simply lack the content necessary to promote learner competency because not enough was known about the occupation when the materials were developed.

Employers, vocational instructors, students, administrators, and program completers could most likely provide insight into the adequacy of existing materials.

Event 2

A list of tasks for each occupation is generated.

In Event 2, a job-task analysis is conducted to determine specific job competencies for the occupation identified in Event 1. The DVACE conducts this same type of analysis in developing its V-TECS performance

objective catalogues. Observation of job performance, consideration of expert opinion, and review of appropriate reference materials provide the data necessary for generating a detailed list of tasks performed in the occupation.

PARTICIPANTS: A job-task analysis, can be conducted by a job analyst, a training specialist, or an instructional designer. In addition, instructors and incumbent workers who have knowledge of job analysis techniques could collaborate and conduct the analysis, validate it, or both.

IMPLICATIONS

A. The product of the job analysis--a complete and detailed list of tasks performed in the given occupation--provides the criteria for determining instructional material content requirements. The relevancy of subsequently procured or developed materials hinges on the adequacy of the job analysis.

> Specification of job competencies is prerequisite to determining instructional material requirements. Identified job competencies serve as the criteria for determining instructional content of the materials. Completing the job analysis thus helps insure that subsequently developed instructional materials are job-relevant. Job-relevant materials are more likely to be used than materials which include content unrelated to job requirements.
>
> Experts and job incumbents in the given occupation could be consulted in order to determine the adequacy of the job analysis.

B. Adequate specification of cues, conditions, and standards associated with various job tasks can promote materials usage.

> In order to prepare learners for employment, instructional materials should address performance cues, conditions, and

standards found in actual work settings. Such materials will prepare learners for required "on the job" performance and will presumably be used more extensively than materials which fail to consider performance cues, conditions, and standards. The opinions of job analysts, instructional designers, instructors, subject matter experts, job incumbents, and potental employers should be considered when assessing whether cues, conditions, and standards for the given occupation have been adequately specified.

Cues, conditions, and standards associated with identified tasks should be specified through the job analysis. Cues are the stimuli within the work environment which signal that a given task should be performed. For instance, seeing two children fighting serves as a cue or signal to a childcare worker to take appropriate action. For a printer, a certain sound made by a printing press might be a cue that the machine is malfunctioning and that a particular action must be taken.

Conditions include environmental factors, available machines, tools, equipment, work aids, and other external circumstances which significantly influence the performance of a given task. Standards specify an acceptable quality of performance for a task. Product standards refer to accuracy, tolerances, completeness, format, clarity, number of errors, or any other established criterion used to assess the quality of a product. Process standards are criteria used to assess the acceptability of the sequencing, completeness, accuracy, or speed of task performance.

Event 3

A search for available task-related instructional materials is conducted

After required job tasks are identified for the given occupation, the search for appropriate instructional materials can begin. The Vocational Instructional Materials Acquisition System (VIMAS), the Florida Educational Information Services (FEIS) and other means, determines the availability of required instructional materials.

PARTICIPANTS: As noted above, the search for required instructional materials is usually conducted by VIMAS personnel.

IMPLICATIONS

A. To promote cost-effectiveness, all available materials which might provide the required instruction should be identified and obtained for review.

> Task-related instructional materials for the given occupation may already exist. If so, then there may be no need to create new materials. Seeking out appropriate, available materials is a cost-effective, logical step. Even if available materials require adaptation, cost-effectiveness is assured. Accordingly, the search for available materials should be a thorough one as this will help insure that all potentially usable materials are identified.
>
> When considering whether all available, potentially usable materials have been identified, the following persons may provide useful information: VIMAS personnel, vocational instructors, and subject matter experts.

Event 4

The instructional materials are judged on the basis of task-related criteria

In this event, a decision must be made as to whether the materials identified in Event 3 will provide the instruction necessary to facilitate learner performance of job-tasks identified in Event 2. If the answer to this question is no, a decision must be made as to whether the materials could be adapted so as to provide the required instruction.

PARTICIPANTS: DVACE Personnel

IMPLICATIONS

A. In judging the relative usefulness of various materials, the guiding question should be--how much instruction relating to the previously identified job-tasks is provided by the learning materials?

Care should be taken to determine the extent to which obtained materials provide instruction for the job-tasks identified in the job analysis of Event 2. Task-related materials are more likely to be used and to prepare students for employment than nontask-related materials.

Instructors, instructional designers, subject matter experts, potential employers, and job incumbents could all provide insight as to whether a given set of learning materials provides the required, task-related instruction.

B. In addition to task-relatedness, the quality and currentness of instructional content should be assessed.

The materials which are eventually selected or developed for use must be able to promote acquisition of required skills and knowledge. Generally, effective materials include clear explanations of applicable concepts, rules, procedures, and definitions. Consideration must also be given to the sequencing of content and to provisions for practice and feedback. (Appendix C includes a list of references on instructional design and instructional materials development; these references cover topics such as sequencing, practice, feedback, etc.)

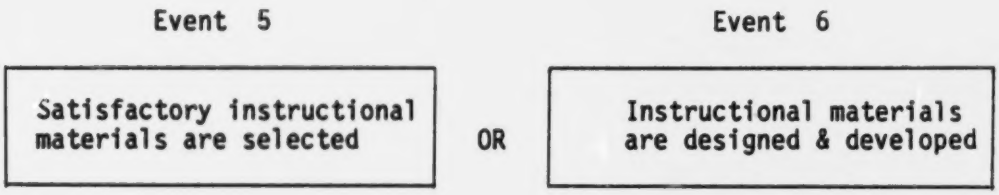
Instructors and instructional designers can provide assistance in judging the relative instructional quality of various materials.

C. Materials should be assessed to determine if they are current and if they reflect the existing state of the occupation.

Materials may be task-related and of reasonable instructional quality, yet still not be appropriate for use. Care must be taken to ascertain if the content is up-to-date enough to prepare learners for employment in the occupation. For instance, materials may provide adequate instruction on tuning an automobile engine using "outdated" equipment while current occupational standards may require use of computerized

equipment when tuning an engine. In assessing whether a given set of materials reflects the current state of the occupation, consideration of performance cues, conditions, and standards specified in Event 2 may be helpful.

Opinions of instructors, job incumbents, potential employers, and subject matter experts might all be helpful in determining if content is current.



In the previous event, available materials were assessed to determine if they were task-related and if they could promote competency in learners. If a given set of available materials can provide required instruction or can be adapted to do so, then Event 5 occurs, and those materials are selected. If the required instructional materials can not be found, then Event 6 occurs, and a project is initiated to design and develop the materials. (A description of the instructional materials development process is provided in Appendix A.) In essence, decisions made in Event 4 determine whether existing materials will be selected or new materials will be developed. Accordingly, implications associated with Event 4 are also associated with Events 5 and 6.

PARTICIPANTS: VIMAS personnel, DVACE Personnel, Vocational Program Directors, Regional Program Consultants, and Vocational Instructors.

IMPLICATIONS

A. Various advantages will be realized depending on whether existing materials are selected or new materials are developed.

> Clearly, the decision of whether to select existing materials or to develop new ones is crucial considering the time and cost involved in an instructional materials development effort. Selection of existing materials is likely to produce advantages such as the following: (1) less "lag time" than if materials are newly developed; (2) financial savings; (3) availability of personnel for other purposes. On the other hand, developing new materials could result in the following advantages: (1) consistency between instructional content and previously identified job-tasks; (2) assurance that content is "current"; (3) opportunity to formatively evaluate and revise the instructional materials.

B. In order to assure that selected materials are used, only those materials which are task-related and which will promote learner competency should be selected for use or adaptation. (This is a reiteration of implication "A" from Event 4.)

> If existing materials (or even newly developed ones) are to be used by instructors and learners, the materials must provide instruction on job-tasks identified in Event 2. Further, the materials must also include content which will facilitate acquisition of required skills and knowledge by learners.
>
> Opinions of instructors, job incumbents, subject matter experts, and instructional designers should be considered in determining the relative task-relatedness and instructional quality of existing materials.

Event 7

The DVACE decides to adopt/adapt the instructional materials

After required instructional materials are obtained or developed, they are submitted to DVACE for review. A panel of reviewers decides whether the materials are to be adopted. If the materials are adopted,

they are turned over to production and dissemination and diffusion (D&D) teams for final packaging and statewide dissemination.

PARTICIPANTS: DVACE Personnel, reading specialists, editors, instructional designers, and instructors.

IMPLICATIONS

A. Only materials which present content in a manner acceptable to instructors and learners should be adopted.

> If adopted materials are to be used, content should be presented in a manner that is acceptable to instructors and students. Instructors are likely to be concerned with the compatability of the materials with available hardware and the appropriateness of the presentation format in light of the environment where the materials are to be used. Instructors may also be concerned with the format and style used in presenting the content as well as with the content's sequence and the size of individual lessons. Adopted materials should also be readable by students. For instance, if the materials primarily consist of printed passages, then learners must be able to comprehend and decode the written words. Similarly, if the materials include numerous illustrations and diagrams, learners must be able to decode such "visual" information if the materials are to be effective.

B. When making adoption decisions, potential learners' existing skills/knowledge levels should be considered.

> Materials which are written at an appropriate level of difficulty for potential learners are more likely to be used than materials which are too easy or too difficult. Consideration of potential learners' previous work, educational experiences and socio-economic levels may assist decision makers when assessing whether learning materials are at an appropriate level of difficulty.
>
> A number of data sources such as available test scores, other school records, or even newly acquired "interview data" might be helpful in discovering learners' existing skills and knowledge levels. If learners who will use the materials have not been identified, the skills and knowledge levels of potential students might be inferred through analysis of

pertinent data drawn from a random sampling of individuals who are representative of potential learners. Finally, insights of instructors, instructional designers, and reading specialists might also be useful in assessing whether learning materials are at an appropriate level of difficulty for potential learners.

Event 8

Graphics Designers determine format, graphics and physical attributes and produce a prototype

After instructional materials have been adopted for production by the DVACE, the materials are turned over to production and D&D teams. Graphic designers, working within guidelines, develop the materials, enhance their attractiveness and usability, and produce the materials in prototype form. While choosing which physical attributes will promote the usefulness of the materials, graphics designers should confront the following questions:

1. How will the materials be packaged?
2. How durable must the packaging be?
3. What will be the shape and weight of the materials?
4. How will the materials be formatted and illustrated?
5. Can use of color enhance the materials' instructional effectiveness?
6. Will the materials be easy to reproduce if required?
7. Will other "structural" or graphic displays increase the usefulness of the materials?

In order to make appropriate decisions regarding these questions, graphic designers and other decision makers must understand the intended purposes of the materials and be aware of the environments in which the

materials will be used. The Purposes by Environments Matrix (Appendix B) provides a framework for classifying the instructional materials according to "how" and "where" they will be used; this matrix can assist production team members in making appropriate production decisions. After the production team has decided which qualities and characteristics will promote the efficiency and utilization of the materials, a prototype version of the materials which incorporates the "production decisions" can be produced.

PARTICIPANTS: Various production team members including graphic designers, instructional designers, editors, and the production team coordinator. Vocational instructors, subject matter experts, and publications specialists might also be involved in advisory capacities.

IMPLICATIONS

A. Graphics designers should collaborate with instructional designers in determining how to format and illustrate the materials to promote instructional effectiveness.

> Instructional designers can make suggestions regarding formatting, illustrations, and use of color which might enhance the instructional effectiveness of the materials. Collaboration between graphic and instructional designers is likely to improve the quality of the materials and to promote their subsequent usage.
>
> In addition to instructional designers, parties who might have valuable suggestions regarding the optimal formatting, illustrating, and packaging of the instructional materials include instructors, the production team coordinator, potential learners, and other DVACE administrators and personnel.

B. Graphics designers and other involved parties should base production decisions on knowledge of the purposes of the materials and of the environments in which the materials will be used.

Packaging and other graphic design decisions will have direct bearing on the utility and effectiveness of a given set of learning materials. The physical attributes of the materials should be consistent with the materials' purposes and should be suitable for the environments where the materials will be used. The Purposes by Environments Matrix (Appendix B) is a tool which can provide clarification of "how" and "where" the materials will be used so that graphics designers can make appropriate production decisions. Basing production decisions on knowledge of "how" and "where" the materials will be used is likely to promote the acceptability, efficiency, and utilization of the materials.

Instructors, project directors, and instructional designers would likely be able to assist graphic designers in understanding "how" and "where" the materials will be used.

Event 9

Dissemination and Diffusion specialists determine D&D strategies

The dissemination and diffusion planning process begins as soon as a given set of instructional materials is adopted by the DVACE. The first step in disseminating the materials is to create awareness of their existence and of their intended use. Brochures, video productions, journal announcements, workshop displays or presentations, and "direct delivery" are all possible means of creating awareness of the materials' existence and intended use. A second step in the dissemination process centers on providing instructors, vocational center directors, and other potential users with first-hand experience with the materials. The purpose of this exposure is to develop

potential users' interest in the materials and to create expectancy for success regarding their usage. Such exposure to the materials may be accomplished through in-service workshops, TV presentations, or teleconferencing.

PARTICIPANTS: DVACE dissemination and diffusion specialists; project coordinator, other DVACE personnel.

IMPLICATIONS

A. D&D personnel should identify "gatekeepers," individuals with the power to divert information from an intended audience, and work to procure the gatekeepers' cooperation in disseminating the materials.

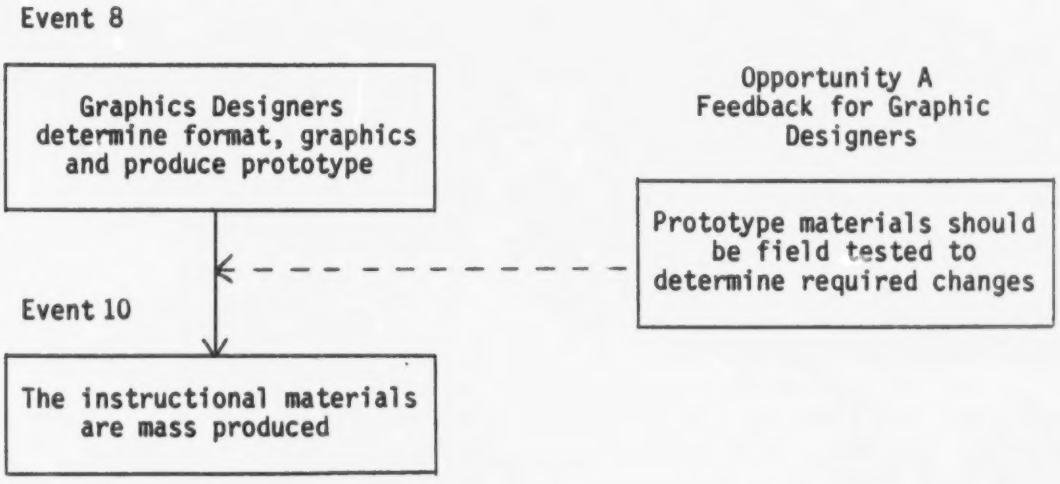
> If materials are to be utilized, potential users must be aware that the materials exist. D&D specialists can produce a poster or brochure announcing a new instructional product, but there is no guarantee that the intended audience will see the announcement. A gatekeeper such as a mailperson, a secretary, or a "bulletin board coordinator" might divert the announcement away from potential users of the instructional materials. In another case, a program coordinator or an instructor may receive an announcement of new materials, but, again, there is no guarantee that the announcement will be shared with others who might be interested. If the materials are to be used, steps must be taken to assure that all potential users are aware that the materials exist.
>
> A variety of persons could be helpful in determining whether information on new instructional materials is reaching the intended audience. Program coordinators, instructors, Voc-Tech center administrators, and gatekeepers, once identified, could provide valuable insights.

PART TWO

INTRODUCTION

We now consider opportunities for obtaining feedback for graphic designers, D&D specialists, and other DVACE decision makers. In the

following pages, five specific opportunities are identified and discussed; generic questions associated with each opportunity and possible uses of subsequently acquired data are also suggested. Interwoven in the opportunities for acquiring feedback are three other events relating to implementation of a given set of instructional materials. These events are the mass production, dissemination, and use of the materials. Figure 3 depicts these three events, the five opportunities for obtaining feedback, and the culminating event of program completers obtaining program-related jobs. Each opportunity is discussed below.


Event 8
Graphics Designers determine format, graphics and produce prototype
Opportunity A
Feedback for Graphic Designers
Prototype materials should be field tested to determine required changes
Event 10
The instructional materials are mass produced

After graphic designers and other production team members have determined how the instructional materials should be formatted, illustrated, and packaged, a prototype is produced (Event 8). Using the prototype, a limited field test should be conducted to determine what changes can increase the materials' instructional effectiveness and use. Table 2 summarizes the purpose and various options for obtaining early feedback for graphic designers on the prototype materials.

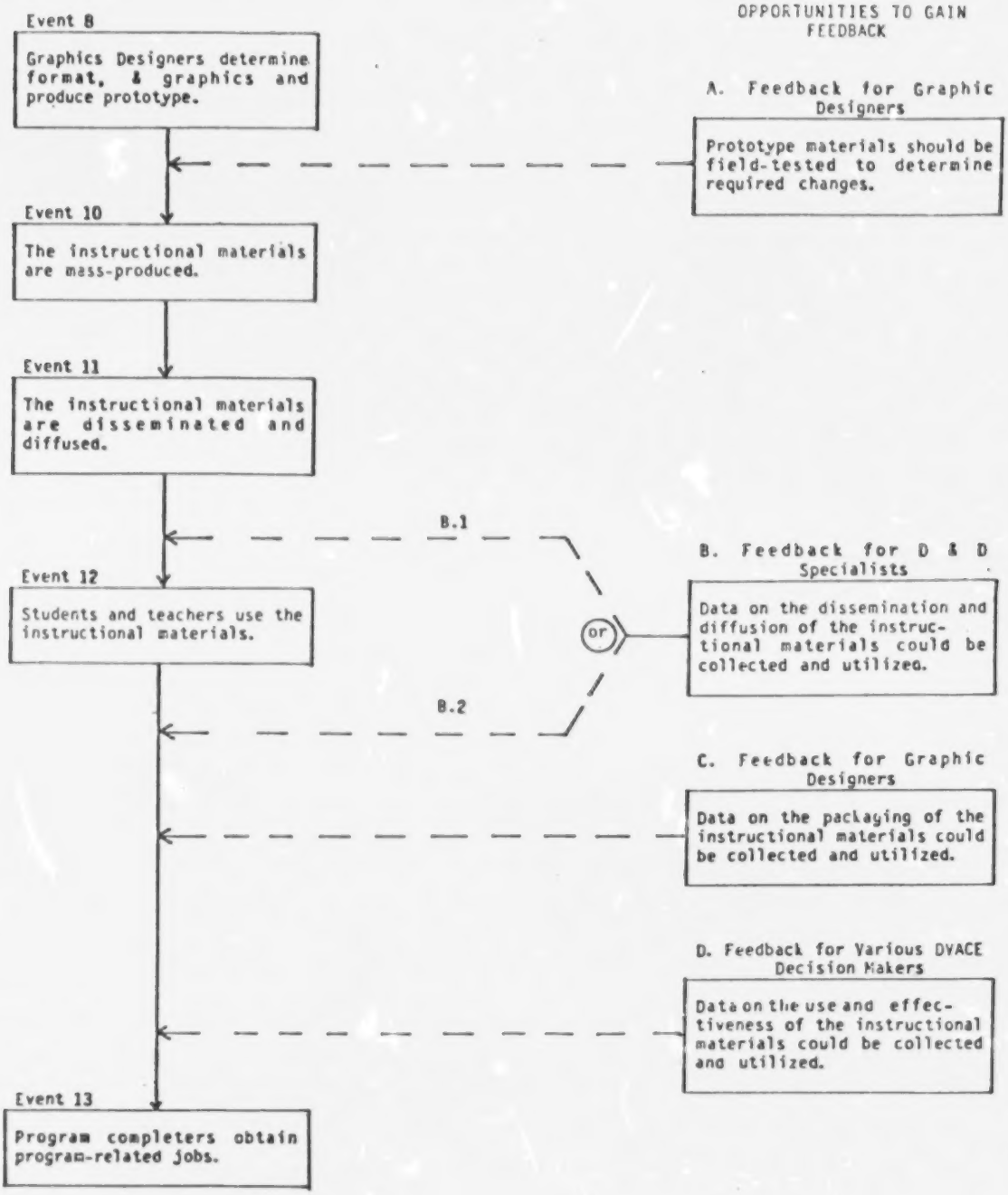

Event 8
Graphics Designers determine format, & graphics and produce prototype.
Event 10
The instructional materials are mass-produced.
Event 11
The instructional materials are disseminated and diffused.
Event 12
Students and teachers use the instructional materials.
Event 13
Program completers obtain program-related jobs.
OPPORTUNITIES TO GAIN FEEDBACK
A. Feedback for Graphic Designers
Prototype materials should be field-tested to determine required changes.
B.1
B.2
or
B. Feedback for D & D Specialists
Data on the dissemination and diffusion of the instructional materials could be collected and utilized.
C. Feedback for Graphic Designers
Data on the packaging of the instructional materials could be collected and utilized.
D. Feedback for Various DVACE Decision Makers
Data on the use and effectiveness of the instructional materials could be collected and utilized.

Figure 3. Opportunities to gain feedback during the flow of production and dissemination events.

Table 1

Opportunity A: Obtaining Feedback For
Graphic Designers on Prototype Materials

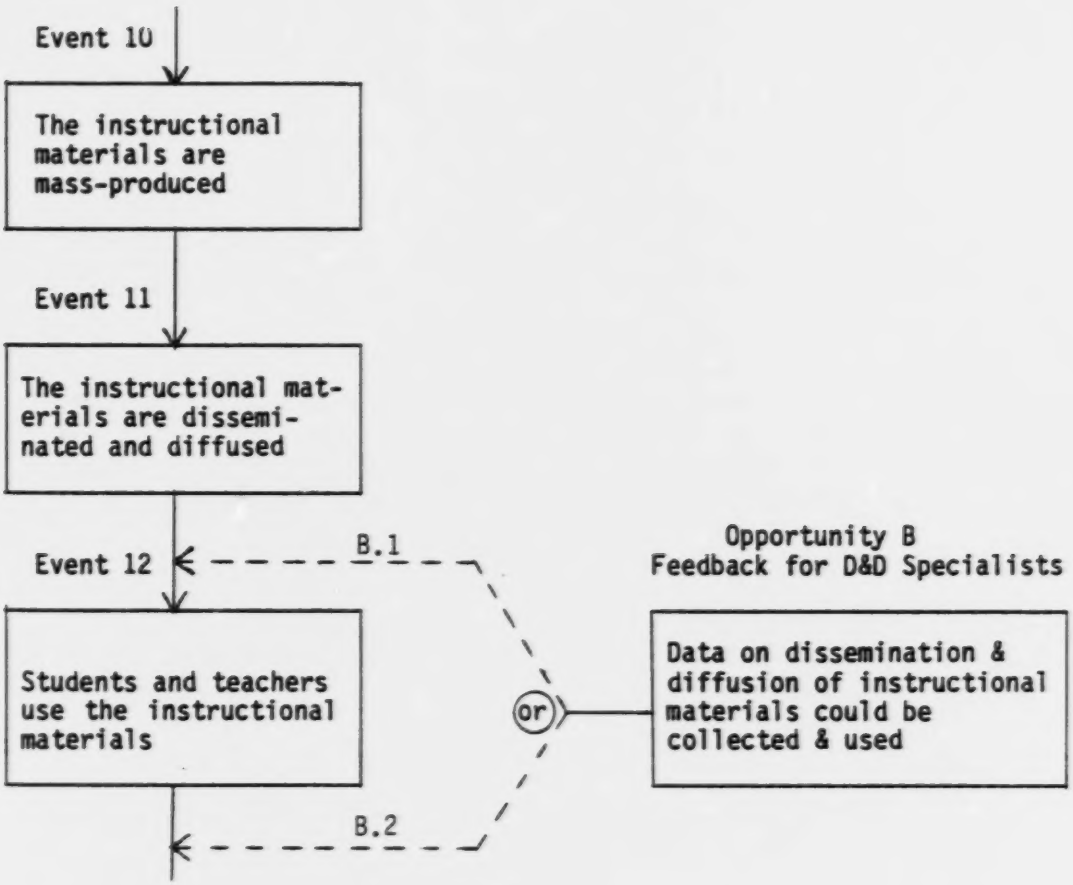
Purpose:	To obtain feedback on the effectiveness of formatting, illustrating, and packaging of prototype materials prior to mass production of them.	
Questions:	o Are format and packaging attractive to users?	
	o Are the materials packaged for convenient use and storage?	
	o Do illustrations and formatting help learners to acquire previously identified job competencies?	
	o Are the materials appropriately packaged for the environment where they will be used?	
	o Are the materials likely to promote acquisition of required competencies by all types of potential learners?	
	o What changes could make the materials more useful and effective?	
Respondents:	Instructors and students	
How Often?	A prototype should be field tested when: (1) materials have been developed for an "emerging" occupation, (2) when a new graphic design approach has been implemented, or (3) whenever there is uncertainty about the effectiveness or utility of newly developed materials.	
Who Could Conduct?	o DVACE staff	
	o University personnel who have been awarded a contract	
	o Local Education Agency (LEA) personnel who have been awarded a contract	
Data Collection Options	o Telephone survey	o Participant Observation
	o Face-to-face interview	o "Combination" approach
	o Survey questionnaire	o Postcard questionnaire
	o Tests	

Early Field Testing. A limited field test might involve as few as five instructors, one from each of the five implementation regions of the state. Thus, the field test would involve five sites. The instructor at each site could assist in obtaining students to work through a portion of the materials. Since these students should be representative of all potential learners, the field test should include students with varied ethnic and socio-economic backgrounds. In addition to learner performance data, data on students' and instructors' attitudes toward the materials could be collected. However, the primary objective here is to obtain feedback regarding the formatting, illustrating, and packaging of the prototype materials and thus identify changes which would increase the materials' effectiveness or utilization. Since this feedback becomes available prior to mass production of the materials, graphic designers can revise the format, illustrations, and packaging as required to increase the mass produced materials' instructional effectiveness and utility.

Feedback on the graphic and instructional design principles applied in the prototype materials may suggest what changes might improve the materials. Required changes should be implemented, and the materials mass produced, disseminated and diffused, and released for use.

As soon as the materials are released, there is opportunity to obtain early feedback on the effectiveness of the dissemination strategy. This opportunity is considered next.

After the instructional materials have been mass produced and disseminated, data on the effectiveness of D&D strategies for the given materials can be collected. If feedback for D&D specialists is obtained soon after the materials are disseminated, then the dissemination

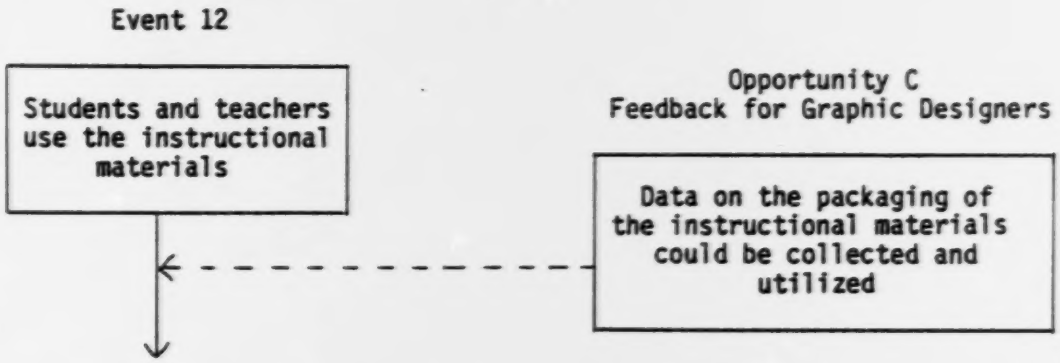


process can be revised within a short period of time to promote awareness, interest, adoption, and usage. Opportunity B-1 (Figure 3) also provides for early acquisition of feedback on the effectiveness of initial D&D strategies.

After the materials have been used over an extended period of time (Event 12), other data could be collected to assess the long term results of the D&D process. If a given D&D strategy is found to be largely successful, then other instructional materials which have a similar purpose and will be used in a similar environment might be effectively disseminated using the same type of strategy. Insights into

the strengths and weaknesses of the long term D&D strategy might also suggest how D&D strategies could be improved in the future. Opportunity B-2 provides for late acquisition of feedback on the long term results of the D&D process.

Clarification of the possible outcomes of the D&D process may be helpful in determining what specific questions to ask in order to acquire feedback regarding the effectiveness of D&D strategies. There are four possible outcomes of the D&D process: (1) materials received and used; (2) materials received, used, and later discontinued; (3) materials received but not used; (4) materials not received thereby making use impossible. These four possible outcomes and associated key questions are presented in Table 3. Determining the major outcome of the D&D process leads to determination of appropriate "follow up" questions which can reveal why D&D strategies were or were not effective. Table 4 summarizes the purpose and various options for obtaining feedback for D&D specialists on the effectiveness of dissemination and diffusion strategies.


Event 12
Students and teachers use the instructional materials
Opportunity C
Feedback for Graphic Designers
Data on the packaging of the instructional materials could be collected and utilized

After the materials have been mass produced and used for an extended period of time by instructors and students, feedback on the long term effectiveness of graphic design principles employed in the materials can

Table 2

Possible Outcomes of the Dissemination & Diffusion Process
And Associated Key Questions

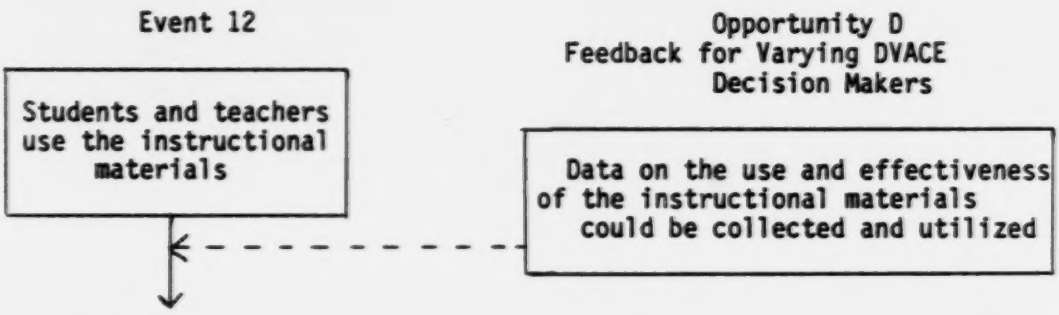
Outcome	Inst. Materials Received?	Inst. Materials Used?	Key Questions
1	Yes	Yes	How were the materials delivered? Who made decisions to use the materials?
2	Yes	Yes, but later discontinued	How were the materials delivered? Why was use discontinued?
3	Yes	No	Who received the materials? Did all potential users know the materials existed? Why were materials not used?
4	No	No	Were the materials sent? Who was the intended audience? How can delivery strategy be changed to insure that materials reach all potential users.

Table 3

Opportunities B-1 & B-2: Obtaining Feedback
For Dissemination & Diffusion Specialists

Purpose:	To obtain feedback on the effectiveness of D&D strategies for Voc Ed instructional materials.	
Questions:	o Are instructors and administrators aware that the materials exist? To what extent?	
	o How did instructors and administrators learn that the materials were available?	
	o If the materials were received but not used, what were the reasons?	
	o If the materials were received and used, to what extent were they used? Why?	
Respondents:	Instructors, administrators, policy decision-makers, and other "gatekeepers."	
How Often?	Feedback for D&D specialists might be obtained when a new D&D strategy has been implemented, when an existing strategy is perceived as ineffective, or whenever there is uncertainty about the effectiveness of D&D strategies for a given set of instructional materials.	
Who Could Conduct?	o DVACE staff	
	o University personnel who have been awarded a contract	
	o Local Education Agency (LEA) personnel who have been awarded a contract	
Data Collection Options	o Telephone survey	o Postcard questionnaire
	o Face-to-face interview	o "Combination" approach
	o Survey questionnaire	

be obtained. If the graphic design principles are validated as effective, then subsequently developed materials which have a similar purpose and will be used in a similar environment can incorporate the same principles. If packaging is unsatisfactory and the graphic design principles are not validated, the acquired feedback may assist in identifying other principles which can be more effectively applied in the future, especially when new materials share similarities with the materials being assessed. Table 5 summarizes the purpose and options for obtaining feedback for graphic designers and other decision makers regarding the effectiveness of instructional materials' packaging. Some of the questions suggested for opportunity A (see Table 2) may also apply here.


Event 12
Students and teachers use the instructional materials
Opportunity D
Feedback for Varying DVACE Decision Makers
Data on the use and effectiveness of the instructional materials could be collected and utilized

After instructors and students have used the materials, data on the instructional effectiveness and overall usefulness of the materials can be collected. Instructors can be surveyed to find out whether the materials were used as primary or supplementary materials. Instructors could also be asked if they have suggestions for altering the materials in order to increase their effectiveness and use. Findings can be incorporated in future materials which have a similar purpose and will be used in a similar environment. Performance data can also be collected to determine whether students have acquired the required

Table 4

Opportunity C: Obtaining Feedback For Graphic Designers on Instructional Materials Packaging

Purpose:	To obtain feedback on the effectiveness of packaging of Voc Ed instructional materials.	
Questions:	o Is the packaging attractive to instructors and students? If not, why not?	
	o Are the materials packaged for convenient use and storage?	
	o Does the packaging promote use of the materials? If not, why not?	
	o How might packaging of subsequently developed materials which will be used in the same environment be improved?	
Respondents:	Instructors and students.	
How Often?	Feedback for graphic designers might be obtained when a new graphic design approach has been implemented or whenever there is uncertainty about the effectiveness of the packaging for a given set of instructional materials.	
Who Could Conduct?	o DVACE staff	
	o University personnel who have been awarded a contract	
	o Local Education Agency (LEA) personnel who have been awarded a contract	
Data Collection Options	o Telephone survey	o Postcard questionnaire
	o Face-to-face interview	o "Combination" approach
	o Survey questionnaire	

Table 5

Opportunity D: Obtaining Feedback on the Effectiveness of Instructional Materials

Purpose:	To obtain data for decision makers on the effectiveness of a given set of instructional materials.	
Questions:	o Are the materials enabling all types of learners to acquire the required competencies? If not, why not?	
	o What "content" changes, if any, would increase the use of the materials?	
	o Do instructors and students like using the materials? If not, why not?	
	o How might format or graphic displays be changed in order to increase the effectiveness or promote the use of the materials?	
	o Are the materials at a high, medium, or low point in their life cycle?	
Respondents:	Instructors and students.	
How Often?	Feedback for various decision makers on the effectiveness of instructional materials could be obtained: (1) when materials have recently been implemented or (2) whenever the effectiveness of given materials requires verification.	
Who Could Conduct?	o DVACE staff	
	o University personnel who have been awarded a contract	
	o Local Educational Agency (LEA) personnel who have been awarded a contract	
Data Collection Options	o Performance test	o Survey questionnaire
	o Written test	o Postcard questionnaire
	o Face-to-face interview	

competencies. Such performance data might reveal learning problems which could be addressed with other materials. In addition, if performance data reveals that learners are having difficulty with a particular part of the subject matter, then steps should be taken to improve instruction in that area for subsequently revised materials. Finally, attitudinal data might be collected to assess instructors' and students' opinions regarding the format, illustration, and instructional content of the materials. Again, such information should be considered when developing other materials in the future. This points out an inherent disadvantage in obtaining feedback so "late" on the instructional effectiveness of given materials. Late feedback can have little impact on the original materials but may be helpful in updating the materials or in producing future products. Table 6 summarizes the purpose and options for obtaining feedback on the effectiveness of a given set of instructional materials.

Event 13

Program completers obtain program-related jobs

Ideally, after completing an occupational program and using the appropriate instructional materials, program completers should be able to obtain program related jobs. This occurrence represents the culmination and "raison d'etre" of the vocational instructional materials development process. Carefully completing the previously described, required activities should increase the likelihood that

subsequently created materials will facilitate acquisition of required competencies by learners and will result in program completers obtaining program-related jobs.

SUMMARY

The model presented in this report identifies multiple opportunities for obtaining feedback for graphics designers and D&D specialists. These opportunities are summarized in Table 6, along with their attendant advantages and disadvantages.

Early Acquisition of Feedback. Of the five opportunities for acquiring feedback, two occur "early" in the vocational instructional materials development process. We believe early acquisition may offer an advantage over "late" acquisition of data whereby feedback is obtained only after the given set of materials has been mass produced, disseminated, and utilized over the long term. By obtaining feedback early--before the materials are mass produced--changes can be made in the formatting, illustrating, or packaging which can increase the likelihood that the materials will "do what they're supposed to do." The earlier in the materials development process that graphic designers receive feedback on the effectiveness of their decisions, the easier it will be to make required revisions to promote the materials' effectiveness and usage. This same advantage holds for feedback for D&D specialists. If feedback on the effectiveness of the D&D strategy is received soon after the initial dissemination effort, D&D specialists will be able to alter that strategy as required in order to improve the dissemination process. Opportunities "A" and "B1" in Figure 3 provide

for early acquisition of data for graphic designers and for D&D specialists. Such data can reveal the relative effectiveness of graphic design principles and the D&D strategy employed for the given materials. Revisions, if required, can then be made to promote long term effectiveness.

Late Acquisition of Feedback. Three other opportunities for obtaining feedback involve acquiring data late in the instructional materials development, dissemination and implementation cycle. After instructors and students have used the materials for an extended period of time, data can be collected to determine whether the principles and strategies utilized in designing, packaging, and disseminating the materials were validated and effective. However, since the materials have long since been mass produced and disseminated, analysis of such data is not likely to lead to rapid changes in content, packaging, or the dissemination strategy. Rather, data obtained at this point may reveal whether the graphic design principles and D&D strategies originally employed in producing and disseminating the materials should be reapplied when new materials are developed and disseminated in the future. Thus, data acquired late may facilitate effective planning of future instructional material projects.

Late feedback can also be utilized to determine if the content of instructional materials is still viable and whether the materials are at a high point in their life cycle--or at a low point--that is, becoming out-of-date. Data acquired late may thus reveal how much demand for the materials still exists and whether the materials merit "long term updating" or should be discontinued. Opportunities "B2," "C," and "D,"

Table 6

Overview of Five Opportunities for Acquiring
Feedback and Associated Advantages & Disadvantages

When Feedback is Acquired	Opportunity	Intended Audience	Advantages	Disadvantages
Early	A. Prototype materials are field tested to determine required changes.	Graphic designers and other production team members	o Materials may be revised as required to promote effectiveness and use. o Data collection costs are lower than for a statewide survey.	o Because of small number of instructors and students participating in the field test findings may not be representative of overall instructor and student populations.
Early	B-1. Data on the dissemination and diffusion of the instructional materials could be collected and utilized.	D&D specialists	o D&D strategy may be revised as required to increase its effectiveness.	
Late	B-2. Data on the dissemination and diffusion of the instructional materials could be collected and utilized.	D&D specialists and other DAVCE decision makers	o Data may be useful in developing future D&D strategies.	o Data cannot be used to revise original D&D strategy.
Late	C. Data on the packaging of the instructional materials could be collected and utilized.	Graphics designers	o Data may be helpful in developing effective packaging for instructional materials developed in the future.	o Data cannot be used to revise original instructional materials packaging.
Late	D. Data on the use and effectiveness of the materials could be collected and utilized.	Curriculum developers, Instructional designers, Graphics designers	o Data may assist with updating the materials or with creating products of similar nature.	o Data not likely to have impact on original materials.

respectively, provide for late acquisition of feedback for D&D specialists, graphic designers, and other DVACE decision makers. The relative advantages and disadvantages associated with the five opportunities for obtaining feedback are summarized in Table 6.

APPENDIX A

FIVE SCENARIOS

PRODUCING COMPETENCY-BASED LEARNING MATERIALS USING A SYSTEMATIC APPROACH

A Scenario

Instructional designers use a systems approach to design instruction with a target population in mind. The purpose is for the learner to achieve specified learning outcomes.

Producing competency-based learning materials begins by asking the following question. What do I want the learner to be able to do when he/she has completed the instruction? Using this question as a guide, designers determine the prerequisite skills that a learner must have in order to achieve the learning goal. Also considered is the skill level at which the learner is presently working, as well as his/her general characteristics (special interests, maturation level, attention span, etc.). By doing this, designers can locate the place where instruction should begin.

Next, performance objectives are determined for each skill that is to be taught. These are specific statements that describe the skills learners must learn and the conditions under which they must perform these skills. In order for instructional designers to clarify in their own mind what is meant by each objective, criterion-referenced or performance tasks are developed. They must reflect the skills the designer wishes the learner to acquire.

At this time designers plan how the instruction will be carried out. This includes identifying preinstructional activities and how the events of instruction identified by Gagne will be provided. Using the instructional procedures as a guide. designers either develop original

materials, utilize existing materials, or both.

In order to assess the quality of the competency-based learning materials, designers conduct formative evaluations. This would include technical reviews of draft materials by qualified context experts, teachers who will use the materials, or both. Formative evaluation data is also collected from learners using one-on-one, small group, or field test procedures. Data collected during formative evaluation is then analyzed to identify any difficulties experienced by learners and to relate these difficulties to specific deficiencies in the learning materials. The learning materials are revised and field-tested again to see if learner performance has been improved as a result of the revisions.

The learning materials continue to be revised until they have been judged to produce the desired levels of learner performance. The materials are then "packaged" and reproduced for dissemination to potential users.

PACKAGING AND DISSEMINATING R&D PRODUCTS

A Scenario

Each year the Division of Vocational, Adult, and Community Education (DVACE) funds R&D projects whose purpose is to address instructional needs that have been determined on the basis of a statewide needs assessment. The needs that have been identified are communicated to LEAs and other organizations such as community colleges and universities. The LEAs and other organizations submit requests for federal funds that are responsive to the needs identified in the needs assessment. Projects that are approved for funding are expected to follow guidelines based on accepted R&D models for product development.

After an LEA or other organization completes an R&D project, it forwards to the DVACE a final report and copies of the learning materials (or other products) that were produced and pilot tested during development. The products are reviewed by a panel of reviewers who must decide whether the product is to be adopted for packaging and statewide dissemination. If the product is adopted, then it is turned over to production and D&D teams for final packaging and dissemination.

The production team does the following things. It edits the R&D product materials to make them more readable and efficient for the intended audience. Graphic designers working with guidelines, design formats so as to enhance the attractiveness and usability of the R&D product. Representatives from the intended audience do a technical review of the package to judge whether it has any obvious deficiencies which should be removed before final production and dissemination.

The final "package" is produced and then turned over to D&D consultants.

The D&D consultants begin to develop a dissemination plan as soon as a decision has been made to adopt the product. The audiences are identified, and procedures are determined which will develop an awareness that the product exists, as well as arouse interest in trying out the materials. Procedures may include brochures, TV skits, displays at workshops, and so on. Incorporated into the D&D process are the general responsibilities that the D&D consultant assumes. Initiating the printing and reprinting of materials, storing and distributing materials, providing in-service training on using the materials and collecting data and conducting impact assessments on materials are all services provided by the D&D consultants.

A follow-up study is done to determine what happened to the R&D product after dissemination. Recipients of the product may be interviewed in person or by telephone or asked to return brief questionnaires which ask them to provide information as to whether the product was used or not used and to give reasons why. The follow-up data are analyzed and interpreted with the findings being provided to graphic designers and D&D consultants who are responsible for packaging and disseminating products that have been adopted by the DVACE. The findings of such follow-up studies are aggregated and analyzed to determine how packaging guidelines and procedures may be changed so as to enhance the attractiveness, usability, and diffusion of R&D products selected for statewide distribution.

HOW INSTRUCTIONAL MATERIALS ARE DISSEMINATED AND DIFFUSED

A Scenario

The D&D planning process begins as soon as the Division of Vocational, Adult, and Community Education (DVACE) selects a product for adoption. The first step in the process is to create an awareness that the product exists and some understanding of its use. Thus, attention to or interest in the product is attained through the use of colorful brochures, TV skits, exposure in journals, displays at workshops, or direct delivery to the user. Assuming the user perceives the product as relevant, the next step is to provide additional experience with the product in order to develop confidence in the product and to create a positive expectancy for success. This may be accomplished through in-service workshops, TV workshops, and teleconferencing. The outcome or reward is satisfaction with the product, leading to adoption and, hopefully, institutionalization of the product. If exposed to conflicting messages about the product, however, the user could reverse his/her previous decision to adopt. In order to avoid this occurrence, reinforcement of the user's decision is the final step. This is achieved through in-service workshops.

With the afore mentioned steps in mind, let's turn to the phenomenon of what happens to a product after dissemination. The scenario now evolves in four possible directions: (1) products never received, (2) products received and never used, (3) products received and used, and products received, used, and later discontinued. Supposing the product was received, the general question of inquiry becomes one of whether the product was used or not used. This

question points to the strengths and weaknesses of the product which, in turn, narrows the perspective to more specific questions. These specific questions of inquiry focus on the content, physical attributes, and diffusion and dissemination of the product and how each of these areas relates individually, collectively, or in any combination thereof to the extent to which the product is used. Conversely, if the product was never received, and entirely different problem is presented. This problem forks in two directions, with the roadblock caused by the diffusion process or by "gatekeepers" not routing the product to the user.

HOW FEEDBACK ON PACKAGING AND DISSEMINATION & DIFFUSION COULD BE OBTAINED

A Scenario

Each of the four outcomes that can result after dissemination (products never received, products received and never used, products received and used briefly, or products received, used, and later discontinued) reflects back on the generic question of whether a product was used or not used and why. Given these questions and outcomes the focus now becomes one of providing feedback to production and dissemination personnel. This process is twofold: identifying respondents and selecting the method of inquiry.

Teachers, students, and administrators are all possible respondents. Identifying which respondents will be most useful depends on: (1) whether the product has been received, (2) which question(s) of inquiry are being addressed, (3) whether the respondent has had ample time to use and become familiar with the product, and (4) the respondent's ability to assess the product.

Selecting a method of inquiry requires attention to cost factors, desired response rate, tolerance for inaccurate responses, the necessity of in-depth information, and the variables connected with identifying respondents. Options for inquiry method include mail-outs, telephone surveys, and face-to-face interviews. Mail-outs are the most economical and reach the largest population, however, the response rate may be low and the responses are often inaccurate. Telephone interviews are more expensive than mail-outs in time and should be limited to a small number of carefully selected respondents.

Face-to-face interviews can provide for more comprehensive, in-depth feedback; cost factors are a consideration, however.

Once the data have been collected the DVACE assigns responsibility for analyzing and evaluating the data and translating them into information or new knowledge about the product. These findings are then reported to the graphic designers and dissemination personnel. This sequence of activities concludes with revisions or improvements taking place, if warranted.

EVALUATING FEEDBACK: JUDGING RESULTS

A Scenario

Data collected from one or more methods of data collection (mail-outs, telephone surveys, and face-to-face interviews) provide the facts that are subsequently transformed into information providing new knowledge or reducing uncertainty about the packaging and disseminating of the product.

In evaluating this new knowledge, the worth of the product or dissemination process is determined. In order to make these judgements of worth, however, performance standards must be agreed upon. Also, if discrepancies are found to exist between the accepted standard and the observed results, the degree of discrepancy that is acceptable must be determined. Then value judgements must be made regarding observed discrepancies.

As the quality of future work will depend on graphic designers and production personnel receiving feedback in a constructive manner, let's look at possible questions that can surround the results following dissemination with regard to judging those results.

If a product is never received, the outcome is obviously unacceptable. If a product is received and used, the outcome may be a success story. The judgement of these two outcomes are clear. Data can still be collected--that is, data about the unaccepability of the delivery system (dissemination) or about the success story (if a product works, let the producers know why). However, if a product is received and never used, some of the questions that arise include: Is

the dissemination system working reliably? What is the rate of non-use? Is the product not used because of its content, design, or both? Conversely, if the product is received, used, and later discontinued some of the question that arise include: How long was the product used before it was discontinued? If the product was only used for a short term, why? What is a reasonable life cycle for this product? If the product has been used for a long time should it be laid to rest or revised and reproduced? To what extent does the product make a significant contribution to students acquiring the required or desired capabilities--those capabilities that are essential for success in the chosen occupational area?

The worth of the product and the effectiveness of its dissemination, then, can be determined by identifying the appropriate respondents and asking the appropriate questions of them. Determining what questions are appropriate is contingent upon which of the four outcomes is most characteristic of the product.

APPENDIX B

PURPOSES BY ENVIRONMENTS MATRIX

AN INSTRUCTIONAL PURPOSES BY INSTRUCTIONAL ENVIRONMENTS MATRIX
FOR GUIDING DECISIONS REGARDING THE PHYSICAL ATTRIBUTES
OF VOCATIONAL INSTRUCTIONAL PRODUCTS

	Environments		
Purposes	Class	Lab/Shop	LRC/Carrel
Instruction	1	4	7
Practice	2	5	8
Assessment & Feedback	3	6	9

The Matrix:

Once it has been decided that an instructional product is worthy of state-wide distribution to all vocational instructors of a given course, then the Purposes by Environments Matrix can be useful. The decision-makers who select the physical attributes of the product should receive, in some form, information about the INTENDED PURPOSES and the INTENDED ENVIRONMENTS the product will be used in. If such information is not immediately available, then it should be obtained as quickly as possible.

Using the information allows the decision-maker to classify the product into one or more of the cells of the matrix. Once the range of purposes and environments has been determined, it is possible to consider generic and specific questions related to those intended purposes and environments. The content of the questions should focus on what the physical attributes of the product should be in order to ensure that the product will do "what it's supposed to do" (purpose) in the location "where it's supposed to be used" (environment).

The Events of Instruction

Gagne (1977) proposes eight generic Events of Instruction which learners must experience in order to effectively acquire competencies.

The Purposes by Environments Matrix is intended to guide decision-making about the best choice among a product's physical attribute alternatives. The Instructional Events can be classified into the three categories of Purpose in the Matrix, the questions generated from each Event can be associated with corresponding cells in the Matrix. This classification is as follows:

Instruction:	1. gain learners' attention
	2. inform learners of the objective
	3. recall prerequisite learning
	4. present the stimulus material
	5. enhance retention and transfer
Practice:	6. provide learning guidance
	7. elicit performance
	5. enhance retention and transfer
Assessment & Feedback	8. provide feedback
	5. enhance retention and transfer

The importance of the Events of Instruction here lies in their relationship to the thinking and learning processes that are prerequisite to the acquisition of vocational competencies. An occupational preparatory program consists of job tasks stated as

objectives. The objectives indicate what the student will be able to do as a result of experiencing the Events of Instruction. Application of an Instructional Event initiates and maintains the thinking and learning processes that are essential and supportive to acquiring an occupational competency.

A Position Paper for Florida (1983) states:

> Competency-based vocational education (CBVE) can be defined as instruction for employment that is based on current job tasks, which are made known to each student before instruction and which, after appropriate instruction is provided, are to be performed by a student under prespecified conditions and according to prespecified standards.

This definition of CBVE relates well to Gagne's Events of Instruction. When the current job tasks "are made known to each student" the Instructional Event "inform the learner of the objective" is being provided. Learners who arrive at an understanding of what they will be expected to do, have experienced this Instructional Event. When students practice the tasks, they are experiencing the Instructional Event "elicit performance". When an instructional product facilitates students experiencing the Events of Instruction, it is better than products which do not provide such experiences. The important point here is that the Events of Instruction can serve as criteria for judging the completeness of vocational instructional products.

For a given product, what is the best choice among the physical attribute alternatives? Which alternative will have the most positive impact on students experiencing the Events of Instruction for each vocational objective?

Asking questions like these for each Event is how the Events of Instruction can serve as criteria for judging the adequacy of the

physical attributes of vocational instructional products. Applying the criteria should ensure that the physical attributes of a product are consistent with the principles of CBVE.

In the section that follows examples of questions to answer in each cell of the Matrix will be provided. The intent is to show how the Matrix provides relevant categories in which decisions should be made about the physical attributes of vocational instructional products.

USING THE MATRIX

Classroom Environment:

Cell 1 (Instruction in the Classroom):

The generic question in Cell 1 is "What decisions about product packaging will have the most positive impact on students experiencing Instructional Events 1-5?"

A. Format and Graphics in Relation to Content

There is an interesting interplay between a product's format and graphics and the product's content. It is important to consider different formats and graphics as well as different ways to communicate the content. There are likely to be times when content speaks for itself regardless of the format and graphics. At other times, without the correct format and graphics, the content might not be attended to. Table 1 shows examples of what to consider in terms of format and graphics and what to communicate about the content. Both content, format and graphics have impact on the degree to which each of the Instructional Events is provided. Choosing the best format and graphics

alternative for the content can help learners properly experience the Instructional Events and acquire the competencies.

B. Durability

If a vocational product is used over and over by many students, as in the case of a reference manual, checklist, or procedural guide, then

Table 1

What to Consider in Format and Graphics with Concern for Communicating Content

Events of Instruction	Format & Graphics	Content
1. Gain learners' attention	Consider various attention grabber graphics techniques (i.e., coloring, bolding). Choose the best, yet affordable technique.	Communicate that the current task is worth mastering. Relate mastering the task to future opportunities as a possible motivatonal technique.
2. Inform learners of the objective	Consider various page layouts and print formats.	Communicate what the task is.
3. Recall prerequisites	Consider using diagrams, figures or charts to show hierarchical relationships.	Stimulate recall of prerequisite skills and knowledge.
4. Present the stimulus material	Consider print, filmstrip, film or video tape.	Describe and/or demonstrate performing the task; present new information.
5. Enhance retention and transfer	Consider using white space, bolding, asterisks, bullets, etc. to highlight or review important features.	Relate task performance to previously unencountered instances.

durability is an issue worth considering. A related issue here is whether or not the product in question is provided to the students by the school. In such cases the product would be used over and over by the students. When durability is an issue, the graphics designer should know about it so she can make decisions that enable the product to stand up to the wear it will encounter. The specific questions are: Is the product material strong enough for the intended life of the product? (i.e., hard vs. soft cover? reinforced holes for 3-ring binder sheets? laminated pages or covers? strength of the binding OK? etc.?)

C. Ease of Duplication

Ease of duplication is an issue when the product is to be consumed, as in the case of worksheets, test booklets, test answer sheets and handouts. The specific question here is "Given the intended use(s), does the product easily lend itself to duplication? (i.e., does it fit well in the photocopier or other duplication equipment?)"

D. Compatibility

If a product is to be used in conjunction with certain kinds of electronic media, audio-visual aids or other products, then compatibility is a relevant issue. Sometimes a product requires updating on a regular basis. A three ring binder works well when this is required. Compatibility is an issue here in terms of page size, page headings, Table of Contents changes and punching the holes for binding. Examples of products or product parts for which equipment compatibility may be an issue are video or audio cassettes, overhead transparencies, filmstrips, and films.

Cell 2 (Practice in the Classroom)

The generic question in Cell 2 is "What decisions about product packaging will have the most positive impact on students experiencing Instructional Events 5-7?"

A. Format and Graphics in Relation to Content

The interplay between a product's format and graphics and its content pertains to all the cells in the matrix. In regard to Cell 2, Practice in the Classroom, the content speaks for itself more often than not. If there is practice in the classroom it is likely to be group discussion where the attempt is to practice or review key concepts such as technique, style and safety of job-tasks activities to-be-performed later. This "mental and verbal practice" is essential, but it is the instructor, not the instructional product, who will "elicit performance" most often and effectively. However, during the times when a product is useful for practice in the classroom, the specific question is "Are there any graphics techniques and prompts that will facilitate students experiencing Instructional Events 5-7?

B. Durability

When an instructional product is useful for practice in the classroom, the specific questions are "Is the product material strong enough for the intended life of the product? Should the cover be hard or soft? Should there be reinforced holes for 3-ring binder pages? Should there be laminated pages or covers? How strong should the binding be? etc.?

C. Ease of Duplication

When an instructional product is useful for practice in the classroom, it is likely that duplication will be required. Learners may be requested to write responses on practice sheets thus making them unusable by other students. The specific and relevant question is "Given the intended use(s), does the product easily lend itself to duplication? (i.e., does it fit well in the photocopier or other duplication equipment?)"

D. Compatibility

If a product is to be used in conjunction with certain kinds of electronic media, audio-visual aids or other products, then compatibility is a relevant issue. Sometimes a product requires updating on a regular basis. A three ring binder works well when this is required. Compatibility is an issue here in terms of page size, page headings, Table of Contents changes and punching the holes for binding. Examples of products or product parts for which equipment compatibility may be an issue are video or audio cassettes, overhead transparencies, filmstrips, and films.

Cell 3 (Assessment in the Classroom):

1. Format and Appearance.

Are there any coloring, bolding, highlighting, size, shape, spacing, arrangement or binding changes that might increase a product's use when the product is intended to fulfill the following instructional purpose in the classroom? (Test booklets one color; answer key and

comments which provide feedback in a standard, contrasting color.)

2. Durability.

Are there any texture or product material changes that might increase a product's use when the product is intended to fulfill the purpose listed in No. 1 above?

3. Reproducibility.

Are there any product changes that would facilitate the reproduction of sections or parts of the product when such activity is appropriate and required or desired? Assessment usually means testing. Should learners be allowed to write responses in the test booklet? Or should they be required to record responses on a separate answer sheet? Should an answer be machine scorable? Matching scorable answer sheets must be printed precisely in the same location on every sheet; therefore, local duplication equipment is not likely to be accurate enough thus requiring that answer sheets be ordered from a commercial printer.

4. Compatibility.

Are there any product specifications that would make the product compatible with any equipment with which the product is intended to be used? If machine scorable answer sheets are to be used, will they be compatible with available scoring machines?

Lab/Shop Environment:

Cell 4 (Instruction in the Lab/Shop):

1. Format and Appearance.

Are there any coloring, bolding, highlighting, size, shape, spacing, arrangement or binding changes that might increase a product's use when the product is intended to fulfill one, some or all of the following instructional purposes in the lab/shop?

a. gain learners' attention

b. inform the learners of the objective(s)

c. recall prerequisites

d. present the stimulus material

e. enhance retention and transfer

2. Durability.

Are there any texture or product material changes that might increase a product's use when the product is intended to fulfill one, some or all of the purposes listed in No. 1 above? Learning aids in a lab/shop environment must be durable enough to withstand the kinds of use and physical conditions found in that lab/shop. Resistance to grease stains, liquids, and rough handling must be considered.

3. Reproducibility.

Are there any product changes that would facilitate the reproduction of sections or parts of the product when such activity is appropriate and required or desired? Or should consumable items be provided in large numbers by the supplier?

4. Compatibility.

Are there any product changes that would make the product compatible with any equipment with which the product is intended to be used? This would pertain to instructional materials in audiovisual form, e.g., audio-or videotapes, filmstrips, movies, and sound/slide presentations.

Cell 5 (Practice in the Lab/Shop):

1. Format and Appearance.

Are there any coloring, bolding, highlighting, size, shape, spacing, arrangement or binding changes that might increase a product's use when the product is intended to fulfill one, some or all of the following instructional purposes in the lab/shop?

a. Elicit performance. The design of materials to elicit performance must be able to be understood without verbal instructions from the teacher because learners are usually on their own in a lab/shop. Would diagrams and pictures facilitate understanding what is to be practiced?

b. Enhance retention and transfer. Spaced and varied practice is usually required to promote transfer. Are transfer situations presented on several occasions? Are learners asked to apply their skills to previously unencountered situations?

2. Durability.

Are there any texture or product material changes that might increase a product's use when the product is intended to fulfill one, some or all of the purposes listed in No. 1 above? Can the proposed materials withstand the level of use and physical factors typically found in labs/shops for this occupation?

3. Reproducibility.

Are there any product changes that would facilitate the reproduction of sections or parts of the product when such activity is appropriate and required or desired? If the nature of the practice exercises results in ½consumming the practice sheet, what is the most economic way to replace these consumable copies (ditto master, Xerox, mimeomaster)?

4. Compatibility.

Are any product changes required that would make the product compatible with the equipment with which the product is intended to be used? The concern for equipment and material compatibility goes beyond audiovisual equipment in this case. Is the occupational equipment congruent with directions or descriptions.

Cell 6 (Assessment in the Lab/Shop):

1. Format and Appearance.

Are there any coloring, bolding, highlighting, size, shape, spacing, arrangement or binding changes that might increase a product's use when the product is intended to fulfill the following instructional purpose in the lab/shop? Will learners have direct access to answer keys or must the teacher administer them? How can feedback be provided to each learner effectively and efficiently?

2. Durability.

Are there any texture or product material changes that might

increase a product's use when the product is intended to fulfill the purpose listed in No. 1 above?

3. Reproducibility.

Are there any product changes that would facilitate the reproduction of sections or parts of the product when such activity is appropriate and required or desired?

4. Compatibility.

Are there any product changes required to make the product compatible with any equipment with which the product is intended to be used?

LRC/Carrel Environment:

Cell 7 (Instruction in the LRC/Carrel):

1. Format and Appearance.

Are there any coloring, bolding, highlighting, size, shape, spacing, arrangement or binding changes that might increase a product's use when the product is intended to fulfill one, some or all of the following instructional purposes in an LRC/Carrel?

- gain learners' attention
- inform the learners of the objective(s)
- recall prerequisites
- present the stimulus material
- enhance retention and transfer

Instruction provided in an LRC/Carrel is usually individualized and

is frequently self-paced. Directions on how to use such materials must be complete and understandable. The materials should also be organized and labelled so that they can be stored and/or retrieved efficiently by learners. Ease of managing LRC/Carrel materials must be an important design consideration. Conservation of storage space is another important factor.

2. Durability.

Are there any texture or product material changes that might increase a product's use when the product is intended to fulfill one, some or all of the purposes listed in No. 1 above?

3. Reproducibility.

Are there any product changes that would facilitate the reproduction of sections or parts of the product when such activity is appropriate and required or desired?

4. Compatibility.

Are there any product changes required to make the product compatible with any equipment with which the product is intended to be used? This is a very important factor for audiovisual materials which will be used in individualized learning carrels. Are video tapes in the appropriate format (VHS vs. Beta)? Should frame advance tones be inaudible or audible on the sound track of a filmstrip or sound slide presentation?

Cell 8 (Practice in the LRC/Carrel):

1. Format and Appearance.

Are there any coloring, bolding, highlighting, size, shape, spacing, arrangement or binding changes that might increase a product's use when the product is intended to fulfill one, some or all of the following instructional purposes in an LRC/Carrel?

a. Provide learning guidance

b. Elicit performance

c. Enhance retention and transfer

2. Durability.

Are there any texture or product material changes that might increase a product's use when the product is intended to fulfill one, some or all of the purposes listed in #1 above?

3. Reproducibility.

Are there any product changes that would facilitate the reproduction of sections or parts of the product when such activity is appropriate and required or desired?

4. Compatibility.

Are there any product changes required to make the product compatible with any equipment with which the product is intended to be used?

Cell 9 (Assessment in the LRC/Carrel):

1. Format and Appearance.

Are there any coloring, bolding, highlighting, size, shape, spacing, arrangement or binding changes that might increase a product's use when the product is intended to fulfill the following instructional purposes in an LRC/Carrel?

a. Assess performance.

b. Provide feedback.

2. Durability.

Are there any texture or product material changes that might increase a product's use when the product is intended to fulfill the purpose listed in No. 1 above?

3. Reproducibility.

Are there any product changes that would facilitate the reproduction of sections or parts of the product when such activity is appropriate and required or desired? Should tests be answered in the test booklet, on a hand-scorable answer sheet, or on a machine scorable answer sheet? Scoring answers in a test booklet is cumbersome and consuming the test booklet is expensive. Hand scored answer sheets can be locally duplicated. Machine scored answer sheets must be purchased.

4. Compatibility.

Are there any product changes that would make the product compatible with any equipment with which the product is intended to be used? Machine scorable answer sheets must be compatible with the kind

of scoring machine which is available. How many different kinds of scoring machines are likely to be used in the field? Do these different scoring machines each require their own kind of answer sheets or are they compatible with more than one kind of machine scored answer sheet?

APPENDIX C

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